REMARKS

Filed herewith is a supplemental Information Disclosure Statement to make of record certain publications as cited in the application.

Claims 1-20 are pending. Claims 14 and 18 have been objected to as containing allowable subject matter but being based on a rejected claim. Claim 1 has been amended. It is respectfully submitted that no new matter has been added.

The Patent Office rejected claims 1-12 under 35 U.S.C. 101 allegedly because the claimed invention is directed to non-statutory subject matter. The Patent Office asserted that the current state of the claim language is such that a reasonable interpretation of the claims would not result in any useful, concrete or tangible product and that selecting a macromodel in order to simulate a transmission line does not result in a tangible output.

The amendment to claim 1 is believed to overcome the 35 U.S.C. 101 rejection. It is respectfully requested that the Patent Office withdraw its rejection of claims 1-12 under 35 U.S.C. 101.

The Patent Office rejected claims 1-13, 15-17, 19, and 20 under 35 U.S.C. 103(a) as being unpatentable over Elfadel, "A Comparative Study of Two Transient Analysis Algorithms for Lossy Transmission Lines with Frequency-Dependent Data," and Roychowdhury, "Automated Macromodel Generation for Electronic Systems."

Claim 1 recites

> A computer modeling system comprising: a processor that has at least one input that receives parameters related to one or more electrical transmission lines, the parameters representing one or more physical characteristics and one or more electrical characteristics of the one or more electrical transmission lines; a database with a set of one or more macromodels that in which the processor is arranged to apply the parameters in a simulation to determine an electrical behavior of one or more of the electrical transmission lines; and **an automatic selection process controlled by the processor that selects a macromodel from the set of macromodels to simulate one or more of the electrical transmission lines.**

Claim 13 recites

> A signal bearing medium tangibly embodying a program of machine-readable instructions executable by a digital processing apparatus to

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perform operations to automatically select a macromodel from a set of macromodels for use in **simulating a transmission line**, the operations comprising: providing input parameters of per-unit-length resistance (R), per-unit-length inductance (L), per-unit-length conductance (G), per-unit-length capacitance (C), length (d), and maximum operating frequency (ω_{max}); computing total distortion (Δ_T) from the input parameters; providing an error threshold (e); comparing the total distortion with the error threshold; and **automatically selecting a macromodel based upon whether the total distortion is more or less than the error threshold.**

Claim 17 recites

A signal bearing medium tangibly embodying a program of machine-readable instructions executable by a digital processing apparatus to perform operations to automatically select a macromodel from a set of macromodels for use in **simulating a transmission line**, the operations comprising: providing input parameters of per-unit-length resistance (R), per-unit-length capacitance (C), length (d), and maximum operating frequency (ω_{max}), and error threshold (ε); computing a critical length ($d_{critical}$) from the input parameters; comparing the length of the transmission line with the critical length; and **automatically selecting a macromodel based upon whether the length of the transmission line is less than or greater than the critical length.**

Elfadel discloses two general algorithms for the modeling of lossy transmission lines with frequency dependent parameters. One of the two general algorithms belongs to the class of the generalized method of characteristics (MoC) where the main idea is to represent the transmission line with a set of admittances and delayed sources representing the terminal behavior. The other general algorithm incorporates sectioning. Elfadel compares and contrasts these two general algorithms but does not disclose or suggest that the general algorithms are selected in a computer modeling system or through a signal bearing medium.

The automated macromodel generation process in Roychowdhury discloses lumped-parameter circuits (made of discrete components) rather than transmission lines (i.e., distributed-parameter circuits) as disclosed in Applicant's application. There is nothing in the prior art that teaches how to automate the generation of a transmission line macromodel.

The distortion mentioned in Roychowdhury refers to lumped-parameter communication circuitry and its calculation requires the analysis of the circuit using a circuit analysis program

such as SPICE.   The distortion disclosed by applicant pertains to transmission lines (i.e., distributed circuits) and is computed prior to circuit analysis.

Furthermore, the automation in Roychowdhury refers to the generation of the macromodel itself rather than to an automated selection between a competing number of already generated macromodels. Applicant's invention teaches the automated selection of a transmission line macromodel from amongst a competing number of already existing macromodels.

Applicant's invention is based on a novel mathematical system that is not found in Elfadel or Roychowdhury (please see at least the equations 3-11 of Applicant's disclosure). These equations are not obvious to one of ordinary skill in the art.

Neither Elfadel nor Roychowdhury, alone or in combination, teaches how to use the total distortion of a multiconductor transmission line (computed solely based on physical characteristics) in a criterion for the macromodel selection of transmission lines.

Claim 1. Neither Elfadel nor Roychowdhury disclose or suggest that a macromodel is selected.   Neither Elfadel nor Roychowdhury disclose or suggest a database from which a macromodel is selected to simulate one or more of the electrical transmission lines. In the Patent Office cited introduction on page 143 of Elfadel, Elfadel merely mentions two approaches to macromodeling and does not disclose or suggest a database from which a macromodel is selected; on page 149, Elfadel discloses that the method of characteristics and the method of matrix Padé approximations have a common architecture but differ in the contents of the front end, model, and back end modules.

Claim 13. Applicant's background of the invention, on page 1, does not disclose or suggest an error threshold level and clearly does not disclose or suggest **automatically selecting a macromodel based upon whether the total distortion is more or less than the error threshold**.

Elfadel's abstract discloses

> Two general algorithms for the modeling of lossy transmission lines with
> frequency-dependent parameters are contrasted and compared. The first
> is based on the generalized method of characteristics while the second is
> based on a more recent Padé macromodeling approach. The different
> approximations made in these two algorithms are contrasted and

computational evidence is presented to show that these two methods complement each other in their properties.

Elfadel, abstract or elsewhere, does not disclose or suggest a signal bearing medium tangibly embodying a program of machine-readable instructions executable by a digital processing apparatus to perform operations to automatically select a macromodel from a set of macromodels for use in **simulating a transmission line**. The claimed subject matter is also not inherent in Elfadel.

Claim 17. Neither Elfadel nor Roychowdhury disclose or suggest that a macromodel is selected. Neither Elfadel nor Roychowdhury disclose or suggest a database from which a macromodel is selected to simulate one or more of the electrical transmission lines. As to the claimed subject matter of "comparing the length of the transmission line with the critical length," Elfadel in the right hand column of page 145 does not address this claimed subject matter. Section III, starting on page 145, left hand column, of Elfadel, discloses a sectioning method, the method of matrix Padé approximations. Neither Elfadel nor Roychowdhury disclose or suggest **automatically selecting a macromodel based upon whether the length of the transmission line is less than or greater than the critical length.**

Thus, claims 1-20 are allowable over the prior art of record.

The Patent Office is respectfully requested to reconsider and remove the rejections of the claims 1-13, 15-17, 19, and 20 under 35 U.S.C. based on Elfadel in view of Roychowdhury, and to allow all of the pending claims 1-20 as now presented for examination. An early notification of the allowability of claims 1-20 is earnestly solicited.

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Respectfully submitted:

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